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THE OPERATIVE TREATMENT IN OCCLUSION
OF THE JAWS.

Presented to the Section on Surgery and Anatomy, at the Forty-eighth
Annual Meeting of the American Medical Association, held
at Philadelphia, June 1-4, 1897.

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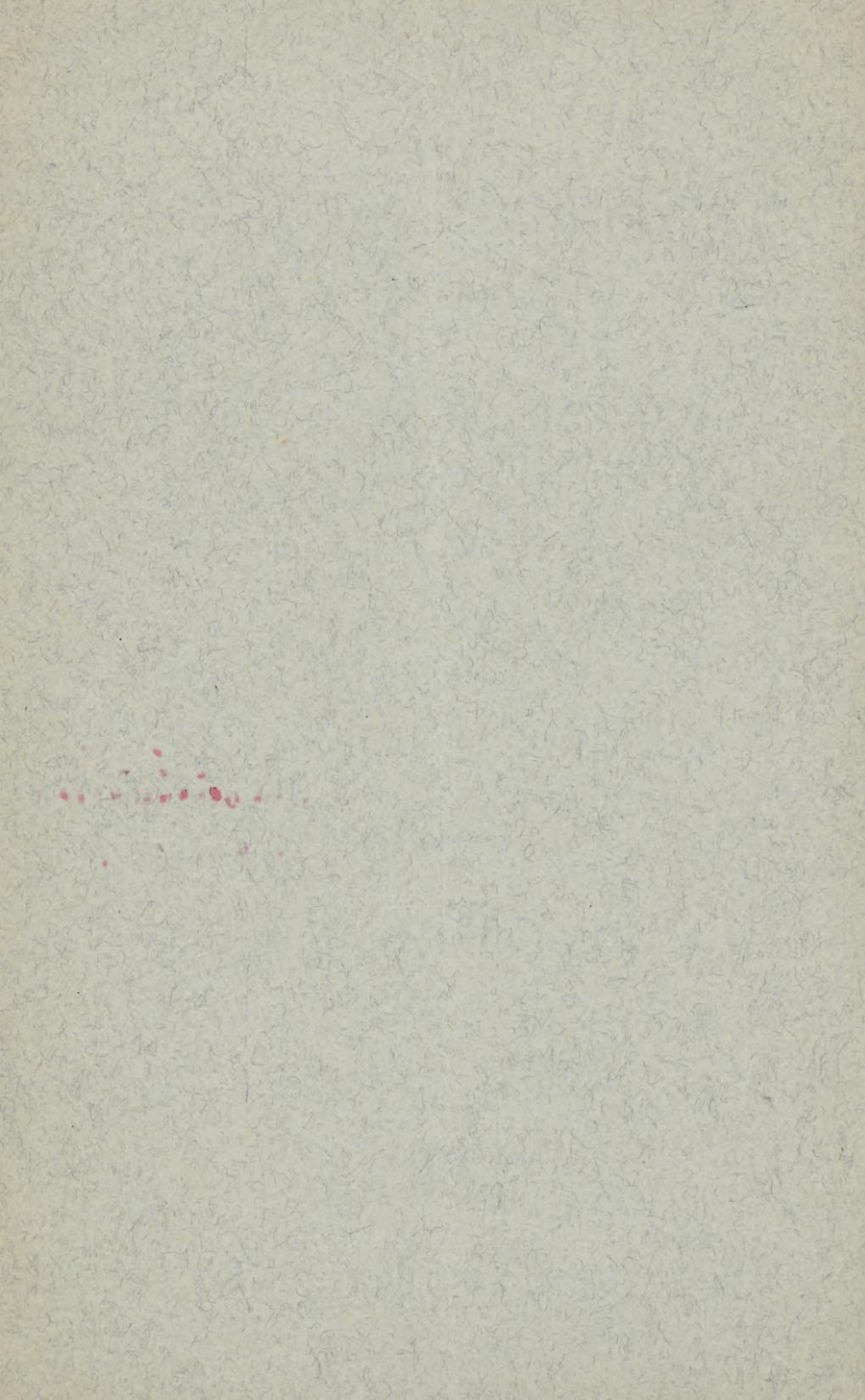
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THE OPERATIVE TREATMENT IN OCCLU- SION OF THE JAWS.

BY J. EWING MEARS, M.D.

At the meeting of the American Surgical Association June 1, 1883, I read a paper on this subject and endeavored to collect all the information which then existed with regard to the procedures which had been in use from the first, for the relief of a condition which may at least be described as one very distressing to the patient. Mr. Christopher Heath of London in the "Jacksonian Prize Essay" of 1867 recorded cases in which he had performed operations for the relief of jaw-closure, and in a chapter devoted to the subject collated the work of others up to that date. According to Mr. Heath's statements, English textbooks on surgery were remarkably barren of any information on the subject. He alludes to a reference of Mr. Cooper in his *Surgical Dictionary*, to a case treated by Dr. Valentine Mott in 1831, in which an operation was performed for closure of an opening in the cheek caused by sloughing and accompanied by closure of the jaws. In the edition of Cooper's *Dictionary* issued in 1861, closure of the jaws is described as occurring "after sloughing of the cheeks and gums from profuse salivation, the cicatricial bands being so rigid as scarcely to allow of the separation of the teeth." By far the most complete account is given in the first edition of Gross' "Surgery." This eminent surgeon had a favorable opportunity for studying the affection during his residence at Louisville, Ky., where, in college and hospital clinics, he was enabled to acquire a large experience owing to

the prevalence of this condition due to the administration of calomel in excessive doses in the south-western sections of the country.

The affection occurs in two forms—the spasmodic or temporary, and the chronic or permanent. The former usually occurs in connection with some condition which affects the motor filaments of the third division of the fifth nerve, causing spasmodic contraction of the elevator muscles of the lower jaw. Among the causes may be enumerated the delayed or difficult eruption of the third molar or wisdom tooth of the lower jaw, the development of tumors from the external surface of the ramus and body of the lower jaw, alveolar abscess in connection with the posterior teeth, necrosis of the jaws, suppurative tonsillitis, and I have observed the condition to follow operations on the lower jaw when performed in the molar region. It may be proper to include under the temporary form of jaw-closure the condition which occurs in connection with attacks of tetanus. This form differs from those described above by reason of the fact that the jaw-closure is one among other symptoms which are present.

The treatment of the temporary form of jaw-closure consists in the removal of the causes. When dependent upon the impeded eruption of the wisdom tooth, the mouth should be opened by levers, the patient being placed under the influence of an anesthetic, and the second molar tooth should be extracted so as to afford space for the third molar, or as the latter is not infrequently found to be an imperfectly developed tooth, the offending organ should be removed. Where tumors, necrosis and alveolar abscesses exist as causes, the treatment is obvious. For the relief of trismus, which is so prominent a symptom of tetanus, remedies which are efficient in controlling the general condition will afford relief.

Permanet jaw-closure may be due to conditions which attach the alveolar processes of the jaws firmly together, or to those involving the temporo-maxillary articulation. Union of the processes of the jaws may

be accomplished through the formation of cicatricial tissue or of an osseous band. The formation of the cicatricial tissue is due to inflammation attacking a portion or the entire buccal mucous membrane. In these cases the inflammation may be due to ordinary causes or, as was most frequently the case in former years, be created by the excessive use of calomel producing severe ptyalism, and, as a rule, it occurred in children. As a result of its occurrence at an early period of life the growth of the lower jaw and the associated structures is very markedly interfered with. I have observed this condition in many of the cases which have come under my observation. The formation of the osseous band may depend upon injury to the parts or arthritic inflammation leading to a deposit of plastic matter and the conversion of this substance into fibrous, cartilaginous or osseous tissue. This bridge of bone may extend from the lower to the upper jaw or from the lower jaw to the temporal bone.

Closure of the jaws due to ankylosis of the temporo-maxillary articulation may occur as a result of inflammation attacking the joint, or of injury leading subsequently to inflammation which results in the formation of fibrous or osseous deposits. Very frequently the inflammatory action which is responsible for the obliteration of the function of the joints is rheumatic in character, and the condition is found to exist largely in those who suffer from rheumatic affections. It may also occur as the result of inflammation due to blows or concussions. The most frequent cause, according to my observation in traumatic cases, is the occurrence of fracture involving the neck of the condyle and which has been unrecognized. Such condition shortly leads to closure of the jaws, and this finally becomes permanent.

The pathologic conditions which produce jaw-closure may exist on one or both sides, that is, it may be unilateral or bilateral. In cases of closure due to the presence of cicatricial tissue or osseous band the diagnosis may be readily made by inspection of the parts and

the introduction of the finger into the buccal spaces. When the temporo-maxillary articulation is involved the diagnosis may be somewhat more difficult, by reason of the inability of the surgeon to decide whether the joint is at all affected, the closure being possibly due to a contracted or rigid condition of the levator muscles of the jaw, and also, when the affection is unilateral, to decide on which side the fault rests. As complete a history as possible should be obtained in every case and both inspection and palpation of the joints should be practiced. The index finger of one hand should be passed into the mouth and carried as far as possible on the inner surface of the ramus of the jaw toward the joint, and the index finger of the other hand should be placed over the joint externally. The patient should then be requested to make an effort to move the jaw so as to ascertain whether any motion exists in the joint. This manipulation should be made on both sides in order to determine in which joint motion may exist. The history of the case, in the event of the occurrence of injury to the joint or fracture of the neck of the condyle, may give information as to the joint involved, but this can not always be depended on. Deviation of the lower jaw to the affected side may sometimes exist, especially when ankylosis has been preceded by some inflammation. In such cases this condition aids diagnosis.

Under the improved methods of treatment the prognosis of jaw-closure may be regarded as favorable. Even in the most inveterate cases, in which the entire buccal spaces on both sides have been obliterated by masses of nodular tissue, operative treatment promises relief.

The treatment of jaw-closure due to the formation of cicatricial tissue has claimed much attention and has taxed the skill and ingenuity of surgeons from the beginning. At first, efforts were directed simply to the division of the tissue and the use, subsequently, of levers varying in power, by which the jaws were separated. The rapid reformation of the nodular tis-

sue, with augmented induration and contractile power, rendered this method futile. Excision of the mass was then practiced with the hope of securing normal membrane in place of the tissue removed. This plan was not successful and was followed by a suggestion, if not the practice, of excision and transplantation of mucous membrane or of integument into the denuded buccal space, taking the flap of integument from so distant a point as the arm. Failure attended these efforts, and in 1851 Professor Esmarch of Kiel read an essay before the congress at Göttingen on the "Treatment of Closure of the Jaws from Cicatrices," in which he advocated the formation of a false joint in front of the cicatricial mass by the excision of a segment of bone of such size as to prevent union of the divided end and the operation was performed by an external incision along the base of the jaw. Professor Rizzoli of Bologna, in 1857, operated for permanent contraction of the jaws by a simple division of the lower jaw in front of the cicatrix, using for that purpose powerful forceps applied within the mouth. In order to prevent union a piece of gutta-percha was inserted between the cut surfaces of the bone, which procedure, it is stated, was accomplished successfully. By these two methods of operation one half of the mouth could be opened slightly, and thus far the operation was regarded as successful. The manifest objections to these methods were: 1. The slight extent to which only a portion of the mouth could be opened. 2. The formation of a disfiguring cicatrix, especially objectionable in females, when the external incision is employed. 3. The fact that this method could not be employed when both buccal spaces were occupied by cicatricial tissue.

Having failed, as others before me had done, by the employment of the different methods in vogue, I was led, in a study of the character of the pathologic structure which existed and of its marked tendencies to union after section as well as its reproductive power, to the adoption of a method by which normal

mucous membrane should form behind the cicatricial mass. It was evident that if such a line could be formed the pathologic tissue in front could be severed without fear of union occurring, and the divided portions could be kept separated and their nutrition modified. In performing the operation a long-handled, slightly curved needle armed with a strong aseptic twisted-silk ligature of sufficient length is introduced at the angle of the mouth on the inner surface and carried carefully into the space between the cicatricial mass and the buccinator muscle and the point made to emerge at the position of the last molar tooth of



Fig. 1.—Closure due to cicatricial tissue. Operation by introduction of ligature and division of cicatricial tissue.

the lower jaw—at which point the posterior border of the cicatricial tissue can usually be felt. The ligature is now seized with the toothed forceps, the needle withdrawn and the ends tied, the ligature lying loosely in the channel thus formed. As the intention is not to divide the mass by the ligature it is permitted to remain without traction, the formation of the canal lined by normal mucous membrane being facilitated by drawing the ligature backward and for-

ward, and thus destroying any adhesions which may form. The introduction of a probe curved so as to easily take the direction of the canal is also of service, and gives the surgeon information as to its condition. When the probe passes readily and smoothly and without provoking bleeding, it may be assumed that the canal is lined by normal mucous membrane. When this condition is established beyond a doubt, in my experience usually at the end of three weeks, a grooved director curved in proper manner, is introduced into the canal and a blunt-pointed bistoury is

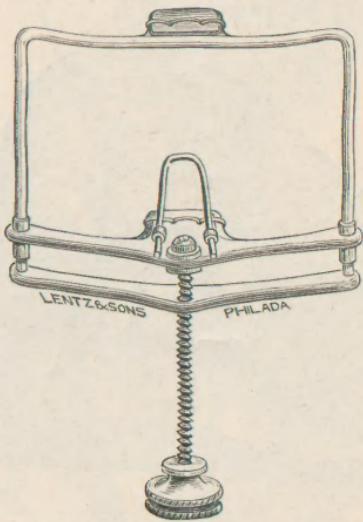


Fig. 2.—Author's gag.

carried along the groove dividing the tissue as it advances. This being accomplished a gag is placed between the teeth and the mouth forced open to its widest extent. The buccal space is then packed with 5 per cent. iodoform gauze, which is replaced the third day, the cavity being thoroughly cleansed with a disinfecting solution at each dressing. At the expiration of the second or third day the gag should be used, opening the mouth to its widest extent, and each day this should be practiced until there is evidence of the formation of normal membrane lining the buccal

spaces, and the patient can without the aid of the gag open the mouth freely, the iodoform packing may be diminished as the reparative process advances. In some instances I have provided patients with a gag and advised its use from time to time, in order that the newly formed membrane may be kept pliable. In a few months, three to four, its use may be dispensed with. My experience with the method above described has demonstrated its value. It overcomes all the objections to the plan which involves the creation of a false joint in front of the cicatrix, and secures as perfect a result as possible.

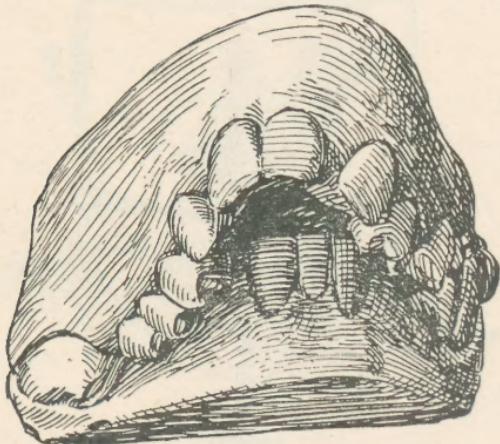


Fig. 3.—Impression of mouth before operation.

As the result of jaw-closure which has occurred at an early period of life; dentition is seriously interfered with. In some cases in which I have operated I have found the teeth projecting in all directions, crossing the oral cavity at various angles and forcing the tongue to rest on its edge. In such cases I take advantage of the anesthetic state of the patient at the time of operation to extract all of the teeth and roots which require removal, and thus prepare the alveolar borders for the adaptation of artificial dentures.

I referred above to the interference with the devel-

opment and growth of the bones and soft structures of the face which sometimes occur in cases of jaw-closure. I exhibit a photograph of a case in which this condition occurred to a marked extent, the patient being at the time of operation 37 years of age, and had suffered from jaw-closure in its severest form for a period of twenty-seven years.

The relief of jaw-closure due to the formation of an osseous bridge is easily accomplished by section of



Fig. 4.—Showing condition of non-development of lower jaw.

the bridge, a metacarpal saw being introduced and division effected from within outward. If the space between the teeth does not permit introduction of the saw into the oral cavity, section may be made from without inward from the buccal cavity. The disuse to which the temporo-maxillary joint has been subjected by reason of the closure frequently renders the joint rigid and motion painful; the use of the gag for a short time overcomes these conditions. More or

less absorption of the divided bony bridge occurs after a time. If the mass is large it may be necessary, in order to overcome deformity, to remove the segments with the chisel or dental saw or burr.

Various methods of operative procedure have been resorted to for the relief of closure due to ankylosis of the temporo-maxillary articulation; these have differed from each other in the selection of the ramus or the condyle as the point at which an effort has been



Fig. 5.—One year after operation.

made to establish a false joint. Fibrous ankylosis can be removed by forcibly breaking the adhesions by movements as in the case of any joint.

To Dieffenbach is due the credit of having first practiced division of the ramus of the jaw, and by this operation creating a false joint for the relief of synostosis. Accompanying this method section of the masseter and temporal muscles has been performed.

In 1863 Grube, as stated by Professor Gross, formed a false joint by dividing the neck of the bone with a straight chisel introduced through the mouth. Excision of the condyle by external incision in front of the ear, was practiced by Professor Gross in 1874 with excellent results in a case of complete synostosis of the lower jaw on the left side in a girl 7 years of age.



Figure 6.

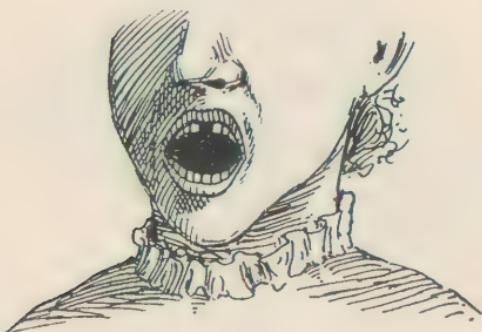


Fig. 7.—Closure due to formation of bridge of bone. Operation by section of bridge by Law. Four years after operation.

A review of the results obtained by these methods shows that neither accomplished all that was desirable. Section of the ramus was frequently inadequate and as frequently failed entirely by reason of reunion of the bone. Excision of the condyle, while affording greater motion than section of the ramus, did not secure the establishment of as freely movable a joint

as desirable, and moreover was performed by an external incision, which is always an objection by reason of the cicatrix formed on the face.

In order to secure a more freely movable false joint I have practiced excision of the upper half of the ramus, removing both coronoid and condyloid processes by an incision within the mouth. The operation is performed by introducing a tenotome beneath the masseter muscle and forming a opening into which an Adams saw is passed, and dividing the ramus. The upper segment of bone is seized by the



Fig. 8.—Closure due to fracture of the neck of the condyle.

lion-jawed forceps and a probe-pointed bistoury is carried through the wound to the position of insertion of the temporal and external pterygoid muscles. The tendons of these muscles are severed and the segment twisted out of its position by the forceps. It may happen that the bone is broken in this effort and the coronoid portion alone removed. When this occurs the chisel is used to remove the remaining portion, including the condyle. In all events enough should be removed to insure ample space for the formation of a large joint, and also prevent, what is not likely to

occur, reunion of the bone. The cavity formed is packed with 5 per cent. iodoform gauze for the purpose, not only of separating its surfaces and expanding it, but also for its service in controlling hemorrhage. The position of the inferior dental and the internal maxillary arteries are to be borne in mind, and injury to them avoided. In the event of their being wounded the hemorrhage may be controlled by the gauze packing. Repacking of the cavity should be made on the third day, and then every

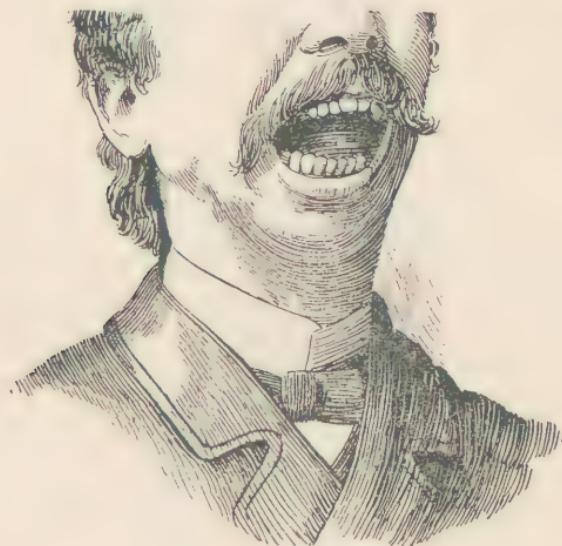


Fig. 9.—Operation by section of ramus and removal of upper segment of bone. Condition 2½ years after operation.

other day, the cavity being cleansed by the injection of a disinfecting solution. The mouth should be opened by the gag, which should be used daily for the purpose of overcoming the rigidity of the opposite joint and of the muscles, occurring as the result of disuse. At the same time its use facilitates the formation of the false joint. Lateral displacement of the jaw does not follow this method as might probably be expected, as may be seen in the photograph

exhibited. In one case it is seen but it will be observed that the deviation existed before the operation and was caused by the inflammatory action which accompanied the necrosis from which the patient had suffered and which produced the ankylosis.

The conclusions which I present are:



Fig. 10.—Lateral deviation due to necrosis preceding operation.



Fig. 11.—Ten months after operation.

1. Jaw-closure due to the presence of cicatricial tissue in the buccal spaces can be most efficiently relieved by the formation of a canal lined by normal membrane, by means of a ligature passed behind the

cicatricial mass. Reunion of the divided tissue and reformation of the nodular tissue not occurring after division when this canal has been formed.

¶ 2. Synostosis of the temporomaxillary articulation, producing jaw-closure, can be best relieved by removal of both coronoid and condyloid processes with the upper portion of the ramus, thus affording ample space for the formation of a freely movable false joint. The operation should be performed through the mouth, thus avoiding disfiguring cicatrices.

